

## First record of coralline fungal disease (CFD) in the Indian Ocean

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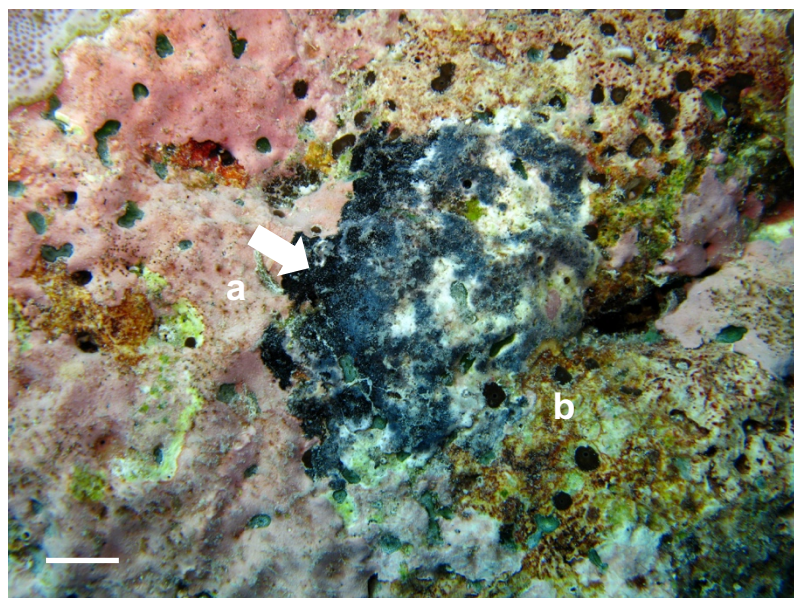
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## First record of coralline fungal disease (CFD) in the Indian Ocean

Crustose coralline algae (CCA) play a key role in calcification and consolidation of substrate on coral reefs, with some species also providing important settlement substrate for coral recruits. Like corals, CCA suffer diseases that threaten their survival and persistence (Vargas-Ángel 2010), including a fungal disease that results in rapid tissue necrosis, particularly during ocean warming events (Williams et al. 2014). Coralline fungal disease (CFD) was first reported at the island of Tutuila in American Samoa in 1998 (Littler & Littler 1998) and later at the islands of Swains and Rose in American Samoa (Vargas-Ángel 2010). Other reports of CFD are restricted to the remote central Pacific at Kingman Reef and Palmyra Atoll in the northern Line Islands (Vargas-Ángel 2010, Williams et al. 2014). Here we report on the first field sightings of CFD in the Indian Ocean at islands within the remote and highly protected Chagos Archipelago, British Indian Ocean Territory (Fig. 1). Of the 29 reefs surveyed during an expedition in April 2018 across ~200 km of latitude, CFD was documented at 8 of them. CFD sightings were



restricted to shallow (< 15 m depth) fore reef habitats and not observed on backreef or patch reef habitats. At two reefs, CFD was at outbreak levels, with > 5 cases m<sup>-2</sup> of CCA. These are among the highest densities of CFD ever reported and appeared to correlate with high host density at these locations (> 50% host CCA cover). The coral reefs of the Chagos Archipelago suffered from back-to-back ocean warming events in 2015, 2016 and 2017 that have reduced live hard coral cover. The high densities of CFD recorded here may represent a residual impact of these warming events, but whether CFD significantly alters key reef processes such as accretion, coral recruitment and substrate consolidation across the region requires further study.

**Fig. 1.** Field signs of CFD affecting crustose coralline algae (*Porolithon* sp.) at Ile de la Passe Island, Peros Banhos Atoll, Chagos Archipelago in April 2018 (forereef habitat, ~8 m depth). The active lesion (white arrow) appears as a black/grey mat that tends to radiate out across the surface of the CCA crust. The CCA tissue remains healthy on the leading edge of the lesion (a) but is quickly colonized by microalgae and turf algae following necrosis (b). These field signs are consistent with CFD descriptions from the Pacific Ocean (Vargas-Ángel 2010) that have been confirmed as being caused by a fungal infection using histopathology (Williams et al. 2014). White scale bar = 1 cm.

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### References

- Littler MM, Littler DS (1998) An undescribed fungal pathogen of reef-forming crustose coralline algae discovered in American Samoa. *Coral Reefs* 17:144
- Vargas-Ángel B (2010) Crustose coralline algal diseases in the U.S.-Affiliated Pacific Islands. *Coral Reefs* 29:943-956
- Williams GJ, Price NN, Ushijima B, Aeby GS, Callahan S, Davy SK, Gove JM, Johnson MD, Knapp IS, Shore-Maggio A, Smith JE, Videau P, Work TM (2014) Ocean warming and acidification have complex interactive effects on the dynamics of a marine fungal disease. *Proc Roy Soc B* 281:20133069

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